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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/735,057	12/11/2003	Todd F. Bischoff	71745 CCD	2508

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EXAMINER

DANIELS, MATTHEW J

ART UNIT	PAPER NUMBER
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1732

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	04/16/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.		Applicant(s)	
	10/735,057		BISCHOFF ET AL.	
	Examiner		Art Unit	
	Matthew J. Daniels		1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 January 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-6 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-6 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-6 are pending. There were no claim amendments in the reply filed 29 January 2007.

Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. The second and alternative rejection of Claim 1 below was set forth previously to address the additional specie claimed in Claims 2 and 4-6 (barium oxide, hydroxide).

3. **Claims 1-3** are rejected under 35 U.S.C. 103(a) as being obvious over Yamamoto (USPN 4690867) in view of Vayda (USPN 4762811) and Callis (USPN 2502418). Yamamoto teaches a method of making an unfired refractory component (7:53-64) comprising:

- a) forming a slurry comprising calcium silicate-containing refractory material (5:21-27)
- b) placing the slurry in a mold (6:4-22)
- d) hydrothermally processing the component to form a final product (6:23-36)

Yamamoto teaches calcium oxide in the form of lime, but appears to be silent to a slurry also comprising a barium- or strontium-containing compound and drying or dewatering the slurry. However, Vayda teaches a barium sulfate powder (2:14) mixed with calcium silicate

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(1:68-2:1 and 2:60-68), and Callis teaches dewatering and drying (3:40-45 and 4:24-34). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the methods of Vayda and Callis into that of Yamamoto in order to reduce the attack of aluminum on the lined melting furnaces and vessels (Vayda, 1:5-35) and to form a block into a rough shape having a desirable amount of water and sufficient strength (Callis, 3:40-45 and 4:25-35). **As to Claims 2 and 3, See Vayda's barium sulfate powder (2:14).**

4. **Claims 1, 2, and 4-6** are rejected under 35 U.S.C. 103(a) as being obvious over Yamamoto (USPN 4690867) in view of Prior, Jr. (USPN 6407023) and Callis (USPN 2502418). Yamamoto teaches a method of making an unfired refractory component (7:53-64) comprising:
- a) forming a slurry comprising calcium silicate-containing refractory material (5:21-27)
 - b) placing the slurry in a mold (6:4-22)
 - d) hydrothermally processing the component to form a final product (6:23-36)

Yamamoto teaches calcium oxide in the form of lime, but appears to be silent to a slurry also comprising a barium- or strontium-containing compound and drying the slurry. However, Prior teaches a barium compound (3:15-20) mixed with calcium silicate (Kaolin clay, 5:55 and 3:10-13), and Callis teaches dewatering and drying (3:40-45 and 4:24-34). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate the methods of Prior, Jr. and Callis into that of Yamamoto in order to produce a reaction with free silica to form an impervious glass structure that resists wetting and reaction with molten aluminum (Prior, Jr., 14:12-35) and to form a block into a rough shape having a desirable amount of water and sufficient strength (Callis, 3:40-45 and 4:25-35). **As to Claim 2, see**

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barium oxide and hydroxide (Prior, Jr., 14:16). **As to Claims 4-6**, Callis teaches forming an aqueous solution of barium hydroxide (1:37-44 and 2:29-55) wherein the addition of the barium compound to water to produce the aqueous solution produces a temperature of at least 30 C (2:29-35) and at least 40 C (2:29-35). It would have been prima facie obvious to one of ordinary skill in the art at the time of the invention to incorporate this aspect of the invention of Callis into that of Yamamoto in order to provide a convenient means for mixing.

Response to Arguments

5. Applicant's arguments filed 29 January 2007 have been fully considered but they are not persuasive. The arguments appear to be on the following grounds:

- a) Yamamoto is concerned with the production of a refractory for contacting low melting point metals, but does not mention problems caused by reaction of the metal with the refractory. The refractory has a xonotlite structure (fibrous aluminosilicate material) produced by introducing xonotlite slurry into the mixture.
- b) Applicant concede that Vayda adds barium sulfate (barite) to the borosilicate frit in fine powder and then uses the combination as an anti-adhesive agent for refractory compositions in order to overcome problems of the prior art, namely the problems of adhesion of the aluminum to the refractory and the decreasing load bearing properties of the refractory (page 3, bottom). However, Applicant argues that there is no teaching that barium sulfate would be useful alone without the presence of borosilicate frit. Applicant argues that Vayda clearly teaches away from use of barium sulfate for refractories. A person skilled in the art would see no reason to combine

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the teachings of Yamamoto (which makes no mention of the use of barium sulfate nor zinc borosilicate frit) and Vayda (which requires the presence of frit and barium sulfate).

c) The product of Callis relates to aluminates and alkaline earth oxide, and not to silicate. There is no suggestion in Callis that of a subsequent hydrothermal treatment, so the drying step is not equivalent or combinable with Yamamoto.

d) Prior requires a firing step and Yamamoto relates to an unfired product. The first step radically changes the solid structure and produces a different class of material. The two are not relevant (analogous). It is clear that the firing step causes reaction between the barium- or strontium-containing compounds and the aluminosilicate.

6. These arguments are not persuasive for the following reasons:

a) Applicant's remarks appear to characterize the mixture of Yamamoto as a fibrous aluminosilicate material. However, the Examiner notes that Yamamoto states that the matrix comprises a xonotlite type calcium silicate, which reads on the claimed invention. To the extent that the arguments are directed at the motivation to combine, the Examiner submits that the motivation for the combination may come from either reference, but that Yamamoto would be motivated to improve the mixture by incorporating the invention of Vayda in order to provide Vayda's anti-adhesion effect.

b) The Examiner submits that the reference must be considered for all that it teaches and that the instant invention and transitional language does not exclude additional components from either the method or the slurry. There are no arguments which would show why the incorporation of the *mixture* of Vayda into the method of Yamamoto would be unobvious or undesirable. Vayda

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implicitly recognizes the benefit of barium sulfate by incorporation of barium sulfate as an essential and excess component (2:30-34) in the disclosed "anti-adhesive agent" (2:9-13) despite the assessment of the prior art contained in column 1. To the extent that Vayda acknowledges teaching in the prior art of barium sulfate incorporated into a refractory, and improves upon that method by use of a barium sulfate anti-adhesive agent with an additional component (zinc borosilicate), the Examiner submits that Vayda acknowledges that barium sulfate was a conventional additive in the prior art for refractories in 1988.

c) Callis teaches that dewatering in a filter press as a first shaping step, and that it is preferred to employ pressure to form the block or cake from the slurry because this results in blocks of greater strength (3:40-45). While Callis does teach an alkali metal aluminate and alkaline earth oxide, it is unclear why the teachings regarding shaping, dewatering, or drying, would be undesirable to Yamamoto, which appears to be an equivalent material using only a different binder.

d) The Examiner submits that the references to Prior and Yamamoto are at least within the same field of endeavor (method of making refractories for casting aluminum) and are therefore analogous. Additionally, with regard to the assertion that the methods are uncombinable because Prior required firing and posited that a reaction takes place, the Examiner asserts that this does not destroy the combination. Yamamoto also suggests that fine surface cracks are provided by heating the surface with a molten metal, *or by a thermal hysteresis in the producing step before the operation* (4:19-26). Thus, Yamamoto suggests a thermal hysteresis, and Prior provides a hysteresis (Fig. 2, for example). The Examiner's position will be that Yamamoto suggests a

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firing step, Prior provides a firing step, and that any step of firing or reacting in Prior would not destroy the combination or make them otherwise non-analogous.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Matthew J. Daniels whose telephone number is (571) 272-2450. The examiner can normally be reached on Monday - Friday, 8:00 am - 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Christina Johnson can be reached on (571) 272-1176. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

MJD 4/12/07

MJD

cf
CHRISTINA JOHNSON
SUPERVISORY PATENT EXAMINER

4/12/07